

# NOTES ON AND DESCRIPTIONS OF SEVEN NEW SPECIES OF MESOAMERICAN CLETHRACEAE<sup>1</sup>

CLEMENT W. HAMILTON<sup>2</sup>

## ABSTRACT

Taxonomic confusion in Mesoamerican Clethraceae, caused by important differences between Sleumer's 1967 monograph and the 1966 "Flora of Guatemala" treatment by Standley and Williams, is resolved. Seven new species of *Clethra* are described also: three from Mexico, *Clethra breedlovei*, *C. oaxacana*, and *C. michoacana*; one from Nicaragua, *C. nicaraguensis*; one from Costa Rica, *C. talamancana*; and two from Panama, *C. tutensis* and *C. coloradensis*.

The genus *Clethra* Gronov. ex L. comprises approximately 70 species, of which about 40 are neotropical (Sleumer, 1967). Sleumer (1967) wrote his monograph of the genus at the same time that Standley and Williams (1966) prepared their treatment of Clethraceae for the "Flora of Guatemala." Standley and Williams (1966: 74) stated that "many of Dr. Sleumer's annotations are accepted here but others are not." The disagreements and resulting taxonomic confusion involve several widespread species that are treated under different names in the two treatments. In an earlier work on the family, Britton (1914) recognized many more distinct species than subsequent authors have thought warranted (Standley & Williams, 1966; Sleumer, 1967; Robertson, 1968).

In preparing Clethraceae for "Flora de Nicaragua" (Hamilton, in prep.), I have attempted to reconcile these differences in order to identify the many specimens collected since 1965. The major differences between Sleumer (1967) and Standley and Williams (1966) are considered below, and recommendations and additions are made where appropriate. Solutions to these taxonomic problems are especially important because the species in question account for approximately 70% of Central American material of *Clethra*. Complete keys to the Mesoamerican species will be included in the "Flora Mesoamericana" treatment of the family (Sutton, in prep.). I examined 75 sheets at MO, the duplicates of which were cited by Sleumer, especially closely. Additional material from F, HNMF, and MO was studied.

## LEGITIMACY OF *CLETHRA OCCIDENTALIS*

Standley and Williams (1966) doubted the legitimacy of the combination *Clethra occidentalis* (L.) O. Ktze., noting that Kuntze (1898) did not cite the basionym. As Sleumer (1967) correctly pointed out, however, the transfer was legitimately accomplished earlier by Kuntze (1891), who clearly cited the basionym, *Tinus occidentalis* L. Steudel (1821) was actually the first to use the name *Clethra occidentalis*, but he did so without citing basionym or authority.

## THE *CLETHRA MACROPHYLLA* GROUP

Standley and Williams (1966) treated *Clethra macrophylla* Mart. & Gal., *C. vicentina* Standl., and *C. occidentalis* (L.) O. Ktze. as one species, *C. macrophylla*, whereas Sleumer (1967) recognized them as separate entities.

The three species appear to be closely interrelated: they share grey-brown inflorescences, usually entire leaf margins, and usually striking color differences between the dark upper surfaces and the pale lower surfaces of the leaf blades. *Clethra vicentina* is easily distinguished, however, by its glabrous leaf blades which often dry grey-green instead of dark brown above. Furthermore, material collected of both *C. vicentina* and *C. occidentalis* in Honduras and Nicaragua shows no evidence of intergradation relative to the characters mentioned above.

The distinction between *C. macrophylla* and *C. occidentalis* is more problematic. The former has longer leaf blades (15–20 cm versus 7–12 cm) and thicker, more reddish pubescence on the leaf

<sup>1</sup> I thank the staff of the Missouri Botanical Garden, particularly Alwyn H. Gentry, John D. Dwyer, and Amy Pool, for their assistance; and Peter F. Stevens, John W. Thieret, and Nancy R. Morin for helpful comments on the manuscript.

<sup>2</sup> Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166.

undersides. The two species occur only allopatrically, however, and careful field study may reveal that they represent one variable species. *Clethra macrophylla* occurs in Mexico, Guatemala, and Costa Rica, whereas *C. occidentalis* occurs in Belize, Honduras, and Nicaragua. If they are to be considered one species, the correct name is *C. occidentalis* (L.) O. Ktze. (the specific epithet published by Linnaeus in 1759) rather than *C. macrophylla* Martens & Galeotti (1842), the name used by Standley and Williams (1966).

Standley and Williams (1966) did not mention *C. hartwegii* Britt. as growing in Guatemala. It is a chiefly Mexican species that also reaches Guatemala and is related to the species considered above. It may be distinguished from them by its short (3–4 mm), robust pedicels and the deep rust-colored tomentum on the inflorescences. Another Mexican species, *C. pringlei* Watson, also belongs in this species group.

#### THE *CLETHRA LANATA* GROUP

Standley and Williams (1966) treated *C. mexicana* A. DC. and *C. lanata* Mart. & Gal. as conspecific and used the former name. They are, however, distinct species. *Clethra mexicana*, which appears to be solely Mexican, has inflorescence rachises that are extremely stout, furrowed, and deep red-brown, and the fruit is large (5–6 mm diam.). *Clethra lanata*, a variable species found from Mexico to Panama, has more slender, pale brown rachises and smaller fruit (3 mm diam.).

I differ with Sleumer (1967), however, on the status of one species in this group. *Clethra rosei* Britt. appears quite distinct and striking in Mexico, with its upper leaf surfaces scabrous to pubescent and its styles usually longer than those of *C. lanata* sensu stricto. The apparent distinction between these two species breaks down, however, because the degree of upper leaf pubescence and style length forms a continuum. Therefore *C. lanata* should include *C. rosei*.

#### *CLETHRA OLEOIDES* AND *CLETHRA GELIDA*

*Clethra oleoides* L. Wms. and *C. gelida* Standl. appear to be closely related. They are unique in having small leaves and peduncles that curve downward and are collected usually above 2,800 m elevation, in elfin forest. I can find only one good character to differentiate the two: the leaf underside texture of *C. gelida* is ferruginous, whereas that of *C. oleoides* is rough and glandular

but not pubescent. *Clethra oleoides* occurs in Mexico and Guatemala, whereas *C. gelida* occurs in Costa Rica; presumably the present-day paucity of suitable habitat between their ranges has resulted in the isolation of populations and consequent speciation.

#### THREE NEW SPECIES FROM MEXICO

***Clethra breedlovei*** C. Hamilton, sp. nov. TYPE: Mexico. Guerrero: ENE of Puerto El Gallo, 2,700–2,850 m, 11 Nov. 1973 (fl), *Breedlove 36098* (holotype, MO-2243945; isotype, CAS).

Arbor ca. 10 m alta, dense atrorufescentibus atque stellato-pubescentibus. Folia petiolis 1.3–1.8 cm longis, laminis 7–12 cm longis, 2.5–5.5 cm latis, supra brunneo-stellato-pubescentibus sulcis nerviorum mediorum dense brunneo-stellato-pubescentibus, infra dense pallido-tomentosis atque ferrugineo-stellato-pubescentibus, venis secundariis 12–15 infra porphyreo-stellato-pubescentibus. Inflorescentiae terminales paniculatae contractae, ramis 6–10, ramis maturis (5–)6–8 cm longis, bracteolis usque ad 6 mm longis. Flores pedicellis 3–4(–5) mm longis; sepala linearia, 4–5 mm longa; petala 5.5–6.5 mm longa; stamina filamentis 2.5 mm longis, antheris 1.5 mm longis; stylus usque ad 3 mm longus. Fructus non visi.

*Tree* ca. 10 m; young branchlets densely deep brown setose and stellate-pubescent. *Leaves* with petioles 1.3–1.8 cm long, densely deep brown setose and stellate-pubescent, terete; blade rigid, elliptic, the apex acute or mucronulate, the base cuneate to obtuse, the margin entire or obscurely denticulate, not revolute at base, 7–12 cm long, 2.5–5.5 cm wide, green-yellow and regularly brown stellate-pubescent above with midvein furrow densely brown stellate-pubescent, densely pale tomentose and red-brown stellate-pubescent below; secondary veins 12–15 pairs, not furrowed above, prominulous below, rusty stellate-pubescent below. *Inflorescences* terminal contracted panicles with 6–10 branches, the mature branches (5–)6–8 cm long; rachises densely deep brown setose and stellate-pubescent; bracteoles to 6 mm long, linear, caducous. *Flowers* with pedicels 3–4(–5) mm long; sepals 5, linear, 4–5 mm long, tomentose without; petals 5, entire or short-fringed, 5.5–6.5 mm long; stamens 10, the filaments 2.5 mm long, the anthers 1.5 mm long; ovary pale tomentose, the style to 3 mm long. *Fruit* not seen.

This species is probably related to *C. mexicana*, with which it shares similar stout dark brown inflorescence rachises. *Clethra mexicana*

leaf blades are obovate to oblong and essentially glabrous above, whereas *C. breedlovei* leaf blades are elliptic and pubescent above.

***Clethra oaxacana*** C. Hamilton, sp. nov. TYPE: Mexico. Oaxaca: road between Teotitlán del Camino and Huatla de Jiménez, 35 mi. E of Teotitlán, 1,650 m, 22 Feb. 1979 (imm. fl), *Croat 48252* (holotype, MO-2981877).

Arbor ca. 10 m alta, dense rufo-stellato-tomentosa. Folia petiolis 1.5–2 cm longis, laminis 10–14 cm longis, 4.5–7.5 cm latis, indumento stellato, supra brunneo-setosis sulcis venarum dense brunneo-setosis, infra ferrugineo-setosis, venis secundariis 9–12 infra dense ferrugineo-tomentosis. Racemi 5–8 fasciculati terminales, racemis 6–10 cm longis, bracteolis 2 mm longis. Flores pedicellis 3–4 mm longis; sepala linearia, 4 mm longa; petala ca. 4 mm longa; stamina filamentis ca. 2 mm longis, antheris 1.2 mm longis. Fructus non visi.

*Tree* ca. 10 m; young branchlets densely red-brown stellate-tomentose. *Leaves* with petioles 1.5–2 cm long, densely brown stellate-pubescent, terete; blade subchartaceous, elliptic to obovate, the apex acute to cuspidate, the base obtuse to truncate, the margin denticulate, not revolute at base, 10–14 cm long, 4.5–7.5 cm wide, indumentum stellate, deep brown regularly setose above with vein furrows densely brown setose, red-brown setose below; secondary veins 9–12 pairs, shallow furrowed above, prominent below, densely red-brown tomentose below. *Inflorescences* terminal clusters of 5–8 racemes, the racemes 6–10 cm long; rachises densely red-brown stellate-tomentose; bracteoles 2 mm long, tomentose, linear, caducous. *Flowers* with pedicels 3–4 mm long; sepals 5, linear, 4 mm long, densely tomentose without; petals 5, fringed, ca. 4 mm long; stamens 10, the filaments ca. 2 mm long, the anthers 1.2 mm long; ovary velutinous. *Fruit* not seen.

This species appears related to *C. alexandri* Griseb., a Jamaican species with long (ca. 10 mm) bracteoles and larger flowers. *Clethra oaxacana* is related also to *C. michoacana* C. Hamilton (see following species description).

***Clethra michoacana*** C. Hamilton, sp. nov. TYPE: Mexico. Michoacán: near San José Lagunillas, pine woods, 8,000 ft., 9 Sept. 1967 (imm. fl), *Oliver et al. 941* (holotype, MO-3099951; isotype, BM).

Arbor usque ad 15 m alta, dense ferrugineo-stellato-tomentosa. Folia petiolis 2.5–4 cm longis, laminis 15–18 cm longis, 8–10 cm latis, supra glabris sulcis vena-

rum rufo-stellato-tomentosis, infra pallido-incanis atque ferrugineo-stellato-tomentosis, venis secundariis 13–16 infra dense ferrugineo-stellato-tomentosis. Racemi 5–7 fasciculati terminales, racemis 7–12 cm longis, bracteolis 9–13 cm longis. Flores pedicellis 1 mm longis, robustis; sepala ovato-linearia, minimum 4 mm longa. Fructus non visi.

*Tree* to 15 m; young branchlets densely red-brown stellate-tomentose. *Leaves* with petioles 2.5–4 cm long, densely red-brown stellate-tomentose, terete; blade rigid, obovate, the apex obtuse, the base obtuse, the margin entire, not revolute at base, 15–18 cm long, 8–10 cm wide, green-brown and glabrous above with vein furrows red-brown stellate-tomentose, pale panose and red-brown stellate-tomentose below; secondary veins 13–16 pairs, furrowed above, prominent below, densely red-brown stellate-tomentose below. *Inflorescences* terminal clusters of 5–7 racemes, the racemes 7–12 cm long; rachises densely red-brown stellate-tomentose; bracteoles 9–13 mm long, linear, persistent in flower. *Flowers* with pedicels 1 mm long, robust; sepals 5, ovate-linear, at least 4 mm long, red-brown tomentose without; petals 5; stamens 10; ovary velutinous. *Fruit* not seen.

This species differs from the related *C. oaxacana* C. Hamilton in having more secondary veins, lacking setae on the upper leaf surface, and having longer, more persistent bracteoles. *Clethra michoacana* differs from the Jamaican *C. alexandri* Griseb. in having longer leaf blades (15–18 cm versus 8–12 cm) and more secondary veins (13–16 versus 8–12).

#### A NEW SPECIES FROM NICARAGUA

Sleumer (1967) cited only one Nicaraguan specimen in his entire treatment; intensive collecting since then has provided much more material, including a new species related to *C. lanata*.

***Clethra nicaraguensis*** C. Hamilton, sp. nov. TYPE: Nicaragua. Jinotega: Carretera Matagalpa–Jinotega, Km 133–134, 1,400–1,480 m, 24 Feb. 1979 (fl), *Grijalva & Araquistain 166* (holotype, MO-3103450; isotypes, BM, CR, HNMN, MBM, MEXU, PMA, TEX, U, US, VEN, XAL).

Arbor 3–10 m alta, atrorufo-velutina. Folia petiolis (1–)1.5–2 cm longis, laminis 8–13 cm longis, 3.5–6 cm latis, supra glabris sulcis venarum sparse stellato-pilosis, infra rufo-lanatis atque stellato-pilosis, venis secundariis (9–)10–12(–14) infra atroferrugineo-villosis.

Racemi 4–12 fasciculati terminales et saepe racemis solitariis in axillis foliorum dispositis, racemis maturis 13–22 cm longis, bracteolis 3–5(–6) mm longis. Flores pedicellis 2–4(–5) mm longis; sepala ovato-lineararia, 4 mm longa; petala 4 mm longa; stamina filamentis 2 mm longis, antheris 1 mm longis; stylus usque ad 2.5 mm longus. Fructus 4 mm longi, 4 mm diam.

*Tree* 3–10 m; young branchlets densely deep red-brown velutinous. *Leaves* with petioles (1–)1.5–2 cm long, densely deep rusty velutinous, often flattened above; blade coriaceous, obovate, the apex obtuse to subacute, the base cuneate, the margin entire or rarely denticulate near apex, revolute at base, 8–13 cm long, 3.5–6 cm wide, dull brown and glabrous above with vein furrows sparsely stellate-pubescent, pale red-brown woolly and stellate-pubescent below; secondary veins (9–)10–12(–14) pairs, furrowed above, prominent below, deep rusty villous below. *Inflorescences* terminal clusters of 4–12 racemes, often also with axillary racemes in distal 3–4 nodes, the mature racemes 13–22 cm long; rachises densely deep rusty velutinous; bracteoles 3–5(–6) mm long, linear, caducous. *Flowers* with pedicels 2–4(–5) mm long; sepals 5, ovate-linear, 4 mm long, tomentose within and without; petals 5, fringed, 4 mm long; stamens 10, the filaments 2 mm long, the anthers 1 mm long; ovary velutinous, the style to 2.5 mm long. *Fruit* a 3-lobed loculicidal capsule, 4 mm long, 4 mm diam., 7 mm diam. after dehiscence.

*Distribution.* Endemic to Nicaragua, 1,200–1,600 m. Flowers mostly from December to March, and fruits mostly from April to June.

*Additional specimens examined.* NICARAGUA. JINOTEGA: Carretera Matagalpa–Jinotega, 1,400–1,500 m, 2 July 1980 (fl), *Moreno 1108* (MO); 20 Aug. 1980 (fr), *Moreno 1874* (MO); Cerro Zamaria, 1,450 m, 5 July 1975 (fl), *Atwood & Neill 97* (BM, MO); Volcán Yalí, 1,500–1,542 m, 9 Apr. 1981 (fr), *Moreno 7924* (BM, HNMN, MO); Montaña Cuspire, 1,500–1,539 m, 10 Apr. 1981 (fr), *Moreno 8029* (BM, HNMN, MO). MATAGALPA: Cerro El Picacho, 1,500 m, 11 Feb. 1965 (fl), *Williams et al. 29181* (MO); finca Sta. María de Ostuma, 10 km N of Matagalpa, 12 Aug. 1977 (fr), *Neill 2312* (MO); El Porvenir, 1,700 m, 11 Mar. 1967 (fl), *Molina 20514* (MO). RIVAS: Ometepe, NE of Volcán Concepción, 13 Mar. 1981 (fl), *Sandino 564* (BM, MO). ZELAYA: Cerro El Hormiguero, 1,100–1,183 m, 15 Apr. 1979 (fr), *Pipoly 5173* (BM, CR, HNMN, MBM, MEXU, MO).

*Clethra nicaraguensis* is distinguished from *C. lanata*, probably its closest relative, by its deep rusty pubescence on the leaf blade undersides and rachises and by its smaller flowers and fruits. *Clethra nicaraguensis* superficially resembles *C.*

*mexicana* in having a dark-pubescent, sturdy inflorescence but differs in having smaller fruit (4 mm versus 5–6 mm diam.), much less robust rachises, and shorter leaf blades (8–13 cm versus 10–16 cm long).

#### A NEW SPECIES FROM COSTA RICA

***Clethra talamancana*** C. Hamilton, sp. nov. TYPE: Costa Rica. Cartago: SE slope of Cerro de la Muerta, Cordillera de Talamanca, along Interamerican Highway, 2,700 m, 23 May 1976 (fl), *Croat 35400* (holotype, MO-3099952; isotype, BM).

Arbor ca. 3 m alta, rufo-stellato-pubescent. Folia petiolis 1.3–2 cm longis, laminis (5–)6–10 cm longis, 2–4 cm latis, indumento stellato, supra pallido-puberulis sulcis venarum dense pubescentibus, infra pallido-incanis atque rufo-pubescentibus, venis secundariis 12–15 infra ferrugineo-pubescentibus. Inflorescentiae terminales paniculatae contractae, ramis ca. 5, ramis maturis 8–12 cm longis, bracteolis 2–3 mm longis. Flores pedicellis 3–4 mm longis; sepala lineararia, 3–3.5 mm longa; petala 4 mm longa; stamina filamentis 1.2 mm longis, antheris 0.8 mm longis; stylus ca. 1.5 mm longus. Fructus non visi.

*Tree* ca. 3 m; young branchlets red-brown stellate-pubescent. *Leaves* with petioles 1.3–2 cm long, densely red-brown stellate-pubescent, terete; blade subcoriaceous, elliptic-obovate, the apex mucronate to acuminate, the base cuneate, the margin mucronate-denticulate throughout, not revolute at base, (5–)6–10 cm long, 2–4 cm wide, indumentum stellate, dull brown and regularly pale puberulent above with vein furrows more densely pubescent, pale pannose and red-brown pubescent below; secondary veins 12–15 pairs, shallowly furrowed above, prominulous below, red-brown pubescent below. *Inflorescences* terminal contracted panicles of ca. 5 branches, the mature branches 8–12 cm long; rachises red-brown pubescent; bracteoles 2–3 mm long, linear, caducous. *Flowers* with pedicels 3–4 mm long; sepals 5, linear, 3–3.5 mm long, puberulent without; petals 5, fringed, 4 mm long; stamens 10, the filaments 1.2 mm long, the anthers 0.8 mm long; ovary pubescent, the style ca. 1.5 mm long. *Fruit* not seen.

The dense red-brown pubescence, small leaves, and short sepals distinguish *C. talamancana* from other *Clethra* species. As more material is collected from high elevations in Costa Rica and Panama, perhaps additional new species will be found to shed light on the presently unknown

affinities of this and the following two species from Panama.

#### TWO NEW SPECIES FROM PANAMA

***Clethra tutensis*** C. Hamilton, sp. nov. TYPE: Panama. Veraguas: Cerro Tute, ca. 10 km NW of Santa Fe, on ridgetop in cloud forest, over 1,000 m, 3 Aug. 1975 (fr), *Mori et al.* 7574 (holotype, MO-3099953; isotypes, BM, MEXU, PMA).

Arbor ca. 7 m alta, brunneo-adpresso-setosa. Folia petiolis 0.5–1 cm longis, laminis 2.5–3.5(–4) cm longis, 1.4–2.2 cm latis, supra glabris sulcis venarum glabris, infra glabris, venis secundariis 7–9 infra rufo-adpresso-setosis. Racemi 5–10 fasciculati terminales, racemis maturis (6–)7–10(–11) cm longis, bracteolis non visis. Flores non visi. Fructus 4 mm longi, 4–5 mm diam.

*Tree* ca. 7 m; young branchlets brown appressed-setose. *Leaves* with petioles 0.5–1 cm long, brown appressed-setose, flattened above; blade subcoriaceous, elliptic to slightly obovate, the apex mucronate-acute, the base cuneate, the margin mucronate-denticulate throughout, not revolute at base, 2.5–3.5(–4) cm long, 1.4–2.2 cm wide, dark brown and glabrous above, pale brown and glabrous below; secondary veins 7–9, furrowed and glabrous above, prominent and red-brown appressed-setose below. *Inflorescences* terminal clusters of 5–10 racemes, the mature racemes (6–)7–10(–11) cm long; rachises red-brown puberulent; bracteoles not seen. *Flowers* not seen. *Fruit* a 3-lobed loculicidal capsule, 4 mm long, 4–5 mm diam., 6–7 mm diam. after dehiscence.

The small leaves, large fruit, and clustered inflorescences distinguish *C. tutensis* from all other species of *Clethra*; its affinities are unknown.

***Clethra coloradensis*** C. Hamilton, sp. nov. TYPE: Panama. Chiriquí: Cerro Colorado, 50 km N of San Felix on continental divide, cloud forest, 1,200–1,500 m, 17 Aug. 1975 (fr), *Mori & Dressler* 7768 (holotype, MO-3099954; isotypes, BM, MEXU, PMA).

Arbor 8–12 m alta, dense rufo-stellato-tomentosa. Folia petiolis 0.8–1.5 cm longis, laminis 4–6 cm longis, 2.5–4 cm latis, indumento stellato, supra puberulis glabrescentibus sulcis venarum dense puberulis, infra pallido-incanis atque ferrugineo-puberulis, venis secundariis 8–10 infra ferrugineo-puberulis. Racemi 6–8 fasciculati terminales, racemis maturis 5–8 cm longis, bracteolis 2.5–3 mm longis. Flores pedicellis 0.5–1 mm longis; sepala ovata, 3 mm longa; petala ca. 3 mm longa. Fructus 2–2.5 cm longi, 3 cm diam.

*Tree* 8–12 m; young branchlets densely red-brown stellate-tomentose. *Leaves* with petioles 0.8–1.5 cm long, densely red-brown stellate-tomentose, terete; blade rigid, obovate, the apex mucronulate-obtuse, the base cuneate, the margin entire, not revolute at base, 4–6 cm long, 2.5–4 cm wide, indumentum stellate, brown puberulent becoming glabrous above with vein furrows densely puberulent, pale pannose and red-brown puberulent below; secondary veins 8–10 pairs, shallow furrowed above, prominent below, red-brown puberulent below. *Inflorescences* terminal clusters of 6–8 racemes, the mature racemes 5–8 cm long; rachises red-brown tomentose; bracteoles 2.5–3 mm long, linear, caducous. *Flowers* with pedicels 0.5–1 mm long; sepals 5, ovate, 3 mm long, puberulent within and without; petals 5, fringed, ca. 3 mm long; stamens 10; ovary tomentose. *Fruit* a 3-lobed loculicidal capsule, 2–2.5 cm long, 3 mm diam., 4 mm diam. after dehiscence.

*Additional specimens examined.* PANAMA. CHIRIQUÍ: N of San Felix at Chiriquí-Bocas del Toro border, on Cerro Colorado copper mine road along continental divide 5,000–5,500 ft., 3 May 1975 (imm. fl), *Mori & Kallunki* 5812 (MO, PMA).

The small, stellate-pubescent, and puberulent leaves, relatively short racemes, minute pedicels, and small fruit distinguish *C. coloradensis* from all other neotropical species of *Clethra*; its affinities are unknown.

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